



# ***Pb Quality Assurance***

***Routine Monitoring and Pb-PEP***



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# Regulatory History



## ***November 12, 2008 Primary NAAQS revised***

- *Changed from  $1.5 \mu\text{g}/\text{m}^3$  to  $0.15 \mu\text{g}/\text{m}^3$*
- *Measured as total suspended particulate at **local conditions***
- *Secondary standard identified as  $0.15 \mu\text{g}/\text{m}^3$*

## ***December 10, 2010 revision***

- *Monitoring threshold lowered from 1 tpy to  $1/2$  tpy*
- *Deploy low-volume  $\text{PM}_{10}$  monitoring at NCORE sites at CBSAs with a population of 500,000 people*
- *15 Airports monitored for TSP-Pb for one year*

# ***Pb Quality Assurance***



***Depending on the monitoring objective,  
two sampling methods may be used***

*High volume sampling*



*Low volume sampling*





***The requirements for monitoring Pb in PM<sub>10</sub> are similar to PM<sub>10</sub> particulate***

*The requirements are found in 40 CFR Part 50:*

*Appendix B – filter holding times*

*Appendix L – sampling method*

*Appendix Q – analytical method (XRF FRM)*

*And scattered through 40 CFR Part 58*

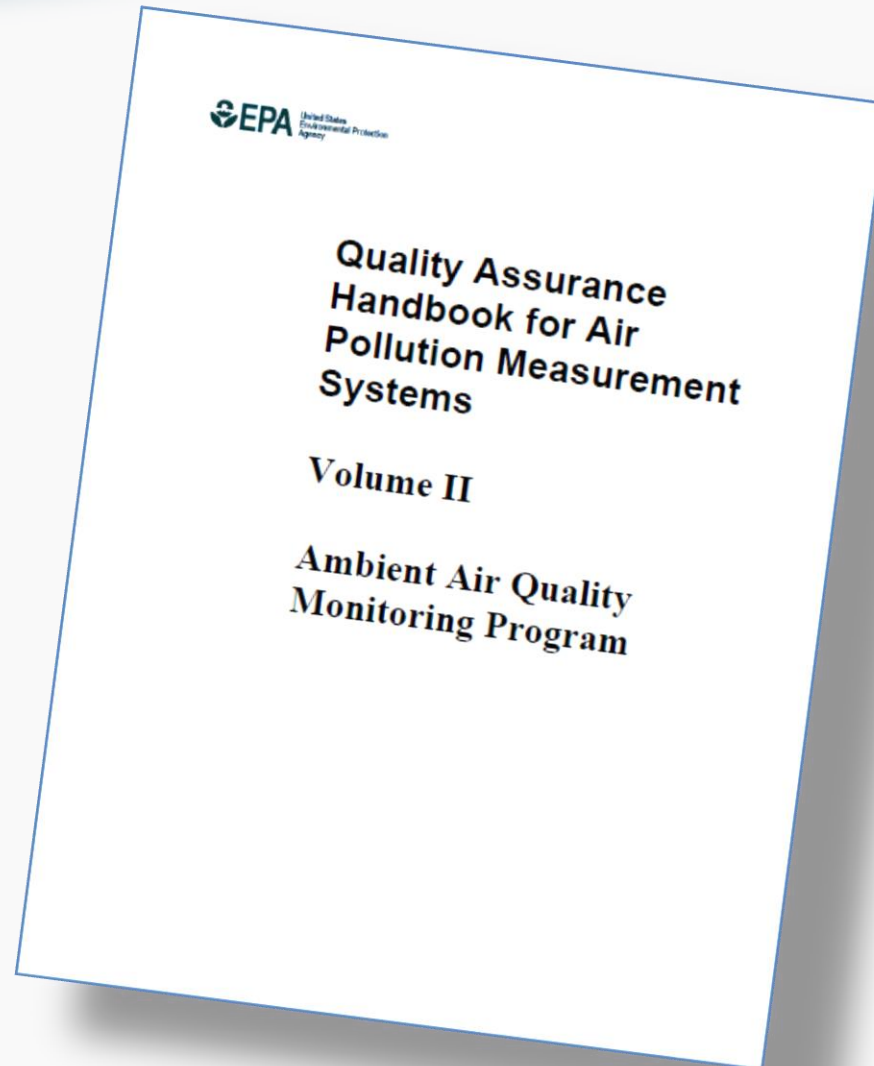
*Appendices A through E – Pb-PEP, siting, reporting, network*

# *Low Volume PM<sub>10</sub>*



***Dennis covered  
them earlier...***

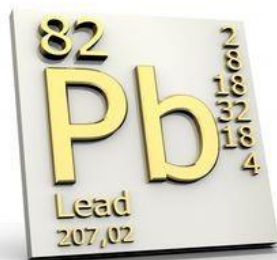
***They are also  
tabulated in the  
QA Handbook  
for easy  
reference***





## ***Notable Differences from low volume $PM_{10}$***

- *Analytical testing of filters for background Pb by OAQPS (~ 20 test filters per lot and 90% of filters < 4.8 ng Pb/cm<sup>2</sup>*
- *Must use an **EPA approved analytical method (FRM/FEM)** for Pb analysis*
- *Quarterly Pb filter audits (more on this later)*
- *Pb-PEP*



# *High Volume TSP*



***The requirements for monitoring Pb in TSP have been around since the dawn of time***

***The requirements are found in 40 CFR Part 50:***

***Appendix B – sampling method (High Vol TSP)***

***Appendix G – analytical method (ICP-MS)***

***ICP-MS is the reference method; however, you can apply for an FEM through ORD***

***And scattered through 40 CFR Part 58***

***Appendices A through E – Pb-PEP, siting, reporting, network***

# High Volume TSP



## ***Field QA critical criteria according to the regulations***

### ***Sample period***

*1440 minutes +/- 60 minutes  
midnight to midnight*

### ***Average flow rate***

*1.1 – 1.7 m<sup>3</sup>/min at local conditions  
(LC)*

### ***One point flow verification***

*+/- 7% once every 3 months (I would  
do this more often depending on how  
much data you are willing to risk)*



# High Volume TSP



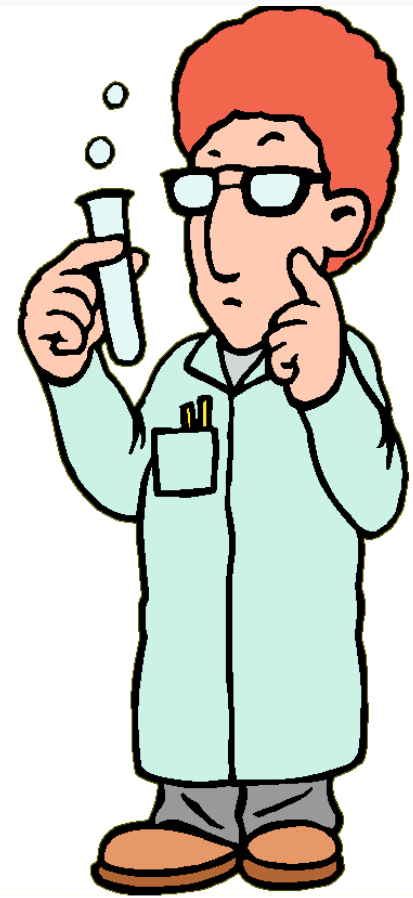
## ***Laboratory QA operational criteria according to the QA Handbook***

### ***Filter media background***

*<75 $\mu$ g per filter (performed by OAQPS, but should be verified in lot blanks)*

### ***Calibration reproducibility checks***

*+/- 5% of predicted calibration curve value performed at the beginning, after every 10 samples, and at the end of each analysis (method dependant)*



# High Volume TSP



## ***Field operational QA critical criteria according to the QA Handbook***

### ***Leak check***

*Conducted prior to flow checks, not a quantitative check, listen for the whistle*

### ***Multi-point calibration/verification***

*5 points distributed over the flow range conducted after receipt, after motor maintenance or failure of 1-point check and 1/yr*

***Note:*** *Samplers with MFC can be done in the field, VFC go to the manufacturer for calibration*



# High Volume TSP



***Field operational QA critical criteria according to the QA Handbook? (continued)***

***These are not in the QA Handbook***

## ***Temperature and BP Audits***

*Recommend auditing quarterly to ensure temperature is  $\pm 2$  °C and BP is  $\pm 10$  mmHg*

*Temperature and pressure are important in samplers that use MFCs to control flow and for samplers using VFCs calibrated under STP conditions*



# *High Volume TSP*



***For the SLT QA Groups, what do you have to do?***

## ***Flow Audits***

*Conduct every 6 months ensuring comparison is +/- 7% of the independent audit standard*

## ***Time checks***

*Conduct every quarter, +/- 2 min/24-hour*

## ***Standards recertification***

*Certify annually against a NIST traceable standard*

## ***Appendix E siting audit***

*Should be a part of an annual TSA*



# High Volume TSP



***Lots of things to measure; tools of the trade...***

## ***Multi-calibrators***

*Can measure flow, temperature and BP simultaneously*



## ***Orifices***

*Measures flow using manometer (slack tube or digital)*



## ***Digital thermometers and BP indicators***

*Stand alone units for specific measurements*



***All of these units must be NIST traceable and certified annually***

# Pb Collocation Requirements



## ***Lead Collocation Requirements:***

### ***High Volume TSP Sampling***

- 15% of each method code in PQA0
- Frequency - every 12 days
- CV < 20% (> 0.02  $\mu\text{g}/\text{m}^3$  cutoff value)

### ***Low Volume PM<sub>10</sub> Sampling***

- 15% of each method code in PQA0
- Frequency - every 12 days
- CV < 20% (> 0.02  $\mu\text{g}/\text{m}^3$  cutoff value)

***Collocation requirement can be found  
in 40 CFR Part 58 App A sec 3.3.4.3***



# National Pb QA Programs



## ***Pb-Performance Evaluation Program (Pb-PEP) and Pb Strips/Filters***

### ***Pb-PEP***

*Independent program that evaluates total measurement system bias (field and laboratory) in the network by comparing collocated samplers with primary samplers*



### ***Pb Strips/Filters***

*Provides a check of laboratory bias between laboratories supporting the Pb monitoring network*





## ***Pb-Performance Evaluation Program (Pb-PEP)***

*Nationally implemented program; however, an implementation option is available for SLTs that can demonstrate independence and adequacy*

***The Pb-PEP has two parts:***

### ***Independent collocated audits***

- *National program run by ESAT contractors or SLT implementers*
- *An external group sets up and runs an independent sampler beside the SLT routine sampler and uses an independent lab for analysis*

### ***Extra SLT collocations***

- *At their collocated site, the SLTs (preferably the QA group) runs an extra collocated sample using their existing samplers on an off-run day*
- *The primary sampler filter goes to the routine state lab, and the collocated sample goes to the Pb-PEP lab*



## ***Pb-PEP Details per PQAO***

***15% of all sites audited per year minimum with all sites audited in 6 years. Must audit at least one of each monitor type each year.***

- *If 5 sites or less, 5 audits per year*
- *If >5 sites, 8 audits per year*

## ***This translates into...***

### ***5 audits per year***

- *1 collocation with an independent PEP sampler*
- *4 filters collected from network collocated sampler*

### ***8 sites per year***

- *2 collocations with an independent PEP sampler*
- *6 filters collected from network collocated sampler*

# National Pb QA Programs



## Pb-PEP Data

- *Pb-PEP Audits begin and end at the AIRQA Website*
- *Field data/Chain of custody sheets*
- *Entry of field data*
- *Upload of laboratory data*
- *Linking of lab and field data*
- *Concentration generation*
- *QA checks*
- *Validation and approval decisions*

Log Out Greg Noah Thursday, August 07, 2014

PM2.5-PEP & Pb-PEP QA Website

Home  
Contact Us  
Pb-PEP  
PM2.5-PEP  
Training  
AA-PGVP  
Pb Audit Order Form

Pb-Performance Evaluation Program

- 1) Documentation
- 2) Filter Shipment Receipts
- 3) EPA or Independent Audit Chain-of-Custody Form and Field Data Sheet
- 4) EPA Raw Sampler Datafiles
- 5) SLT Site-Collocated Chain-of-Custody Form and Field Data Sheet
- 6) EPA Region 9 Analytical Results (Hi-Vol Pb-TSP)  
DRI Analytical Results (Lo-Vol Pb-PM10)
- 7) Audit Status
- 8) Audit Approval



## ***Pb-PEP Data Issues***

- *All field data is not being entered into AIRQA; therefore it is very difficult to pair with lab data*
- *Data is not being approved on AIRQA in a timely manner*
- *Slow upload to AQS*

## ***So What Do We Do?***

- *ENTER DATA INTO AIRQA!!*
- *Approve data on a routine basis*
- *Get familiar with re-engineered AQS to speed uploads*



***Lets get it done...***



## ***Pb-Strips/Filters***

***For each laboratory analyzing for Pb NAAQS:***

*6 strips/filters must be analyzed quarterly (24 annually)*

*The 6 filters will have certified values split between two ranges:*

- *3 at low range (30-100% of the NAAQS)*
- *3 at high range (200-300% of the NAAQS)*

*The check must be within **10% difference** of the certified value of the strip or filter*

***ICP-MS is a destructive analysis so 24 strips are required***

***XRF is not destructive so only 6 Teflon filters are required***

# National Pb QA Programs



## ***Pb-Strips/Filters Ordering Directions***

- *Mike sends out a notice every year that he is ordering audit filters (about May)*
- *When you get the email, **order the filters***
- *Here's the web link to AIRQA:  
<https://www.sdas.battelle.org/airqa/>*
- *If you do not order, you will get automated reminders*
- *Only one POC in each agency gets the email, make sure it is the right contact and let us know if a change is needed.*
- *Fill out the form and tell us how many filters you need*

***Crackin' the whip...***



***Very easy... JUST DO IT***

## **Mike's ~~Rant~~ Clarifications:**

***“You monitor for Pb but do not need to order Pb analysis audits because you lab makes their own***

*Submit an entry of “no audits requested”. This removes you name from the email list*

***You monitor for Pb but feel a contract lab you are using has already ordered***  
*Order filters (even if the contract lab has ordered). Once you identified the laboratory on the entry screen, if other monitoring organizations identified the same laboratory or if the contract lab themselves ordered, only one order would have been placed for that lab and the costs would be distributed equally to all monitoring organization using that facility. This removes your name from the email list*

***You no longer monitor for Pb***

*Submit an entry of “no audits requested” and provide free form notes that you no longer are monitoring for Pb. Your agency, and you as a point of contact would be removed from the data base.”*

***- Mike Papp***

# ***Pb Performance Evaluation Program***



## ***Questions following Mr. Coats presentation***

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